

REMARKS

By the above amendment, the claims which stand withdrawn from consideration, i.e., claims 2, 3, 9, 10, 14 and 18 have been canceled without prejudice to the right to file a divisional application directed thereto. Additionally, claim 19 which has been objected to has been canceled without prejudice or disclaimer of the subject matter thereof. Claim 1 which has been objected to has been amended in the manner suggested by the Examiner such that the objection to claim 1 should now be overcome. Furthermore, new claims 20 - 26 have been presented wherein claim 20 depends from claim 1 and recites further features of the present invention while claim 21 is a new independent claim, reciting features as will be discussed below and claims 22 - 26 depend therefrom.

Applicants note that the present invention as indicated in the abstract is directed to a liquid crystal display device in which the reflection of light from a transmissive region is reduced, the contrast of images is enhanced, and a display of inverted images is suppressed. More particularly, the present invention as illustrated in Figures 2 and 3 of the drawings, for example, and as recited in independent claims 1 and 21 of this application, has a glass substrate 8 on which a silicon nitride film 9 is formed with a silicon oxide film 10 being formed on the silicon nitride film, and thereafter an arrangement of other films and electrodes as illustrated and claimed, wherein a film thickness of the silicon nitride film is larger than a film thickness of the silicon oxide film, and as described at pages 42 - 45 of the specification, for example, the film thickness of the silicon nitride film is selected to be within a particular range so as to reduce reflection light from a transmissive region of the liquid crystal display device. That is, as described at page 43, lines 4 - 14 of the specification, while it has been known to protect the polysilicon film from

impurities of the substrate by providing a film thickness for the silicon nitride film to be more than 45 nm and a range of 50nm to 180nm is a range determined by focusing on the advantageous effect of reducing the intrusion of impurities from the substrate, in accordance with the present invention, in order to decrease the reflection, the film thickness is restricted to a narrower range.

More particularly, as illustrated in Figure 5 of the drawings of this application, and described at page 43, line 14 to page 44, line 12 of the specification, the film thickness is selected to be in a range wherein the spectral luminescence reflectance assumes the minimum value. This range represents a range of the lower portion of the curve as illustrated in Figure 5, for example, whereby the spectral luminescence reflectance can be suppressed to a low value. As pointed out at page 44 lines 6 - 12 of the specification, when the film thickness of the silicon nitride of the background film is adjusted within a range of 10% of the thickness, it is necessary to adjust the film thickness of the silicon nitride of the background film in a range of 118nm to 169nm, which restriction of film thickness relates to the film thickness of the transmissive portion within the pixel region. It is noted as described at pages 43 and 44 of the specification, the range may be restricted further. Applicants submit that the claims of this application recite the aforementioned features which are not disclosed or taught in the cited art, as will become clear from the following discussion.

The rejection of claims 1, 4 - 8, 13, 15 and 17 under 35 USC 103(a) as being unpatentable over Yamanaka et al (US 6,372,558) in view of Morosawa et al (JP 06-132306) and the rejection of claims 11 - 12 and 16 under 35 USC 103(a) as being unpatentable over Yamanaka et al and Morosawa, further in view of Baek (US

6,657,689), such rejections are traversed insofar as they are applicable to the present claims.

As to the requirements to support a rejection under 35 USC 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the recent decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown

authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

In setting forth the rejection, the Examiner contends that Yamanaka et al discloses the claimed features of the claimed invention, and particularly contending that Yamanaka et al discloses the "silicon nitride (SiN) film is formed between the silicon oxide film and the substrate (see col. 12 last paragraph 2 col. 13 first paragraph)" (emphasis added). Contrary to the position set forth by the Examiner, this portion of Yamanaka et al sets forth:

In order to prevent diffusion of Na ions from the glass substrate, a SiN film (for example a thickness of 50 to 200nm) and, if required, a silicon oxide film (referred to as a "SiO₂ film" hereinafter (for example, a thickness of about 100nm) may be continuously previously formed on the surface of the substrate 1. (emphasis added).

Applicants submit that in accordance with the disclosure of Yamanaka et al, when required, the silicon oxide film is first formed on the substrate 1, and thereafter, the silicon nitride film is formed thereover. This arrangement is clarified at column 14, lines 42 - 45 in relation to formation of such films over the layer 7. That is, "as shown in Fig. 2A (step 5) SiO₂ (thickness of about 200nm) and SiN (thickness of about 100nm) are continuously formed in this order over the entire surface of the silicon crystal silicon layer 7 ...". Thus, applicants submit that contrary to the claimed features of independent claim 1 as amended, in accordance with the Examiner's suggestion, Yamanaka et al does not disclose or teach that "between the silicon film and the substrate and between the pixel electrode and the substrate, a silicon oxide film and a silicon nitride film are formed, the silicon nitride film being formed between the silicon oxide film and the substrate." (emphasis added). Thus, applicants submit

that Yamanaka et al teaches away from the structural arrangement as recited in claim 1, as well as the structural arrangement as recited in new claim 21 of "a first silicon nitride film formed on the first glass substrate; and a first silicon oxide film formed on the first silicon nitride film; a gate insulating film formed over the first silicon oxide film ...". Accordingly, applicants submit that independent claim 1 and the dependent claims, as well as independent claim 21 and the dependent claims patentably distinguish over Yamanaka et al in the sense of 35 USC 103 with respect to this feature, and irrespective of the disclosure of Morosawa et al, it cannot be considered obvious to combine Yamanaka et al and Morosawa et al in the sense of 35 USC 103 since such combination would be contrary to the disclosure of Yamanaka et al. Furthermore, it appears that Morosawa et al is directed to manufacture of a semiconductor device and is not directed to a liquid crystal display device of the present invention. Thus, applicants submit that independent claims 1 and 21 and the dependent claims thereof patentably distinguish over this proposed combination of references in the sense of 35 USC 103 and should be considered allowable thereover.

Applicants further note that Yamanaka et al as well as Morosawa et al do not disclose the problem of reflection from a transmissive region of the liquid crystal display device and the solution to such reflection problem by providing the layer arrangement and thickness arrangement, as recited. It is noted that new independent claim 21 recites a particularly structural arrangement having a transmissive region, a backlight and a reflector and that the film thickness of the first silicon nitride film falls within range of 118nm to 169 nm which, as shown in Fig. 5 of the drawings of this application, is a region where the spectral luminescence is reflectance is minimized, whereas a thickness outside of such a range results in

increased spectral luminance reflectance with respect to such a range. As is apparent from Fig. 5, improved results are obtained when the film thickness of the silicon nitride film falls within a range of 118nm to 169 nm, with dependent claims 4 and 5 and 22 further restriction the range of film thickness for the silicon nitride film. Additionally, it is noted that new dependent claim 20, which depends from claim 1, as well as claim 26, further recite the feature that the silicon nitride film and silicon oxide film are configured so as to reduce reflection light from a transmissive region of the liquid crystal display device, which functional limitations are not disclosed or taught in the cited art. Thus, applicants submit that all claims of this application patentably distinguish over Yamanaka et al, taken alone or in combination with Morosawa, recognizing that such a combination is not a proper combination in the sense of 35 USC 103.

With respect to Baek et al, it is readily apparent that this patent does not overcome the deficiencies of Yamanaka et al as pointed out above and fails to provide the claimed structural arrangement of the independent and dependent claims of this application. Thus, applicants submit that all claims patentably distinguish over this proposed combination of references in the sense of 35 USC 103 and should be considered allowable thereover.

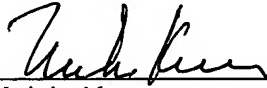
In view of the above amendments and remarks, applicants submit that all claims present in this application patentably distinguish over the cited art and should now be in condition for allowance. Accordingly, issuance of an action of favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli,

Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 501.42964X00),
and please credit any excess fees to such deposit account.

Respectfully submitted,

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